

## DEPOSITION OXIDE WITH IMPROVED OXYGEN BONDING

### ABSTRACT OF THE INVENTION

5           A deposition oxide interface with improved oxygen bonding  
and a method for bonding oxygen in an oxide layer are provided. The  
method includes depositing an M oxide layer where M is a first element  
selected from a group including elements chemically defined as a solid and  
having an oxidation state in a range of +2 to +5, plasma oxidizing the M  
10 oxide layer at a temperature of less than 400° C using a high density  
plasma source, and in response to plasma oxidizing the M oxide layer,  
improving M-oxygen bonding in the M oxide layer. The plasma oxidation  
process diffuses excited oxygen radicals into the oxide layer. The plasma  
oxidation is performed at specified parameters including temperature,  
15 power density, pressure, process gas composition, and process gas flow. In  
some aspects of the method, M is silicon, and the oxide interface is  
incorporated into a thin film transistor.